

## **Does Concentrated Coarse Particulate Matter Exposure Produce Adverse Health Effects?**

Don Graff

Post-Doc

U.S. EPA Office of Research and Development (ORD)/ National Health and Environmental Effects Research Laboratory (NHEERL)

(919) 843-5155

graff.don@epa.gov

**Authors:** Donald Graff<sup>1</sup>, Robert Devlin<sup>1</sup>, Gary Norris<sup>2</sup>, Ron Williams<sup>2</sup>, Wayne Cascio<sup>3</sup>, Phil Hopke<sup>4</sup>, Robert Willis<sup>5</sup>

<sup>1</sup>U.S. EPA ORD/NHEERL

<sup>2</sup>U.S. EPA ORD/National Exposure Research Laboratory (NERL)

<sup>3</sup>East Carolina University

<sup>4</sup>Clarkson University

<sup>5</sup>Alion Science and Technology

**Keywords:** human health, particulate matter, CAPS exposure, cardiopulmonary, coarse particles

The potential for experiencing adverse health effects from particulate matter (PM) exposure is an important public health issue. Mortality associations have generally been shown to be stronger for “fine” PM (<2.5  $\mu\text{M}$ ) produced by combustion processes (e.g., power plants, automobile or diesel engine exhaust) than for “coarse” PM (>2.5  $\mu\text{M}$ ) originating from wind-blown dust, crustal materials, mechanical processes, and biogenic components (e.g., pollen fragments, bacterial cell walls). However, outcomes, such as increased emergency room visits for asthma exacerbation or hospitalizations for respiratory or cardiovascular problems, are also considered significant. The toxicological potency of coarse PM is a major issue in many parts of the Western United States because wind-blown dust can contribute significantly to the coarse PM concentration and can bring some areas out of attainment of the coarse PM standard. Therefore, the U.S. Environmental Protection Agency’s (U.S. EPA) Office of Research and Development (ORD) has indicated that one of their highest priorities is a better understanding of whether coarse particles cause adverse health effects and warrant continued regulation. To provide information needed to understand the health effects of coarse PM, the U.S. EPA investigators in the NHEERL and NERL have formed a collaborative effort with scientists at multiple academic institutions to determine the health effects of coarse PM exposure.

Studies utilizing concentrated ambient particles (CAPS) allow scientists to more directly identify the causative features of PM by allowing for a detailed analysis of the particles to which participants are exposed. A new-generation instrument is now available that allows concentration of coarse PM without concentrating gases or other size particles. In the current study, young, healthy participants were exposed to concentrated Chapel Hill coarse particles or clean, filtered air for two hours on separate days. Multiple health endpoints were measured before and after each exposure to determine whether coarse PM exposure affects systemic and lung inflammation, the ability of blood to clot, and heart rhythms. This poster will report changes in cardiopulmonary endpoints in people exposed to CAPS versus clean air. Future efforts will attempt to link these health indices with specific PM components and sources.

Using expertise from the ORD and academic laboratories, this study will attempt to fill a gap in the scientific knowledge surrounding coarse PM exposure. Furthermore, it will expand the scientific basis for the National Ambient Air Quality Standards (NAAQS) and improve scientific information for standards implementation necessary for regulatory decisions concerning public health risks posed by PM.

This abstract does not necessarily reflect U.S. EPA policy.